The Effects of Bank Consolidation on Risk Capital Allocation and Market Liquidity*

Chris D'Souza and Alexandra Lai

Historically, regulatory restrictions in Canada and the United States have inhibited the ability of financial institutions operating in one area of the financial services industry from expanding their product set into other areas, but deregulation has allowed these institutions to offer a broader range of banking, insurance, securities, and other financial services.[1] At the same time, deregulation in the industry has increased competition, prompting financial institutions to look for new, profitable lines of business. Some institutions have found it advantageous to merge in order to generate higher returns through economies of scope or scale. The impact of consolidation on market liquidity in government securities and foreign exchange markets is of immediate concern to policy-makers. Ensuring liquidity in these markets is important to governments and central banks interested in maintaining or enhancing the functioning of these markets so that they can effectively implement fiscal and monetary policies. In Canada, policy-makers are concerned about the declining number of dealers in Government of Canada

1. Prior to reforms undertaken in 1987 and 1992, the Bank Act and provincial legislation enforced the separation of financial institutions in Canada into five principal groups: chartered banks, trust and loan companies, co-operative credit movements, insurance companies, and securities dealers. In the United States, the Glass-Steagall Act of 1933 sought to impose a rigid separation between commercial banking and investment banking; the Act limited the ability of banks and securities firms to engage directly or indirectly in each other's activities.

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fixed-income markets and foreign exchange markets, and they worry that increased consolidation among financial institutions will cause liquidity in these markets to fall.

This paper analyzes the impact of financial consolidation on market liquidity by studying the effects of consolidation on the risk-bearing capacity of market-makers (or dealers) in dealership markets. To carry out our analysis, two previously separate areas of research are bridged. The first, market microstructure theory, focuses on how market participants and the trading mechanism affect price discovery and market liquidity. The second, risk management, influences the way in which firms look at the returns and risks of individual business operations. Our analysis traces the impact of a merger on the capital-allocation decisions of the new, merged financial institution and the resulting change in the behaviour of dealers.

Effective risk management promotes stability in financial institutions and the industry itself by protecting institutions against market, credit, liquidity, operational, and legal risk. This protection is obtained primarily through the maintenance of an appropriate level of risk (or economic) capital by financial institutions. The risk-management process involves estimating how much risk each business unit or division contributes to the total risk of the firm and thus to overall capital requirements. Capital held by the firm is then "allocated" across divisions. Since investment decisions and risk exposures are determined at the division level, correlations between portfolios held by different divisions are externalities among units that create a need for centralized risk management. Hence, the optimal capital allocation induces the appropriate risk-taking behaviour of division managers by forcing them to take into account the externalities their division imposes on the rest of the firm.

Using a model in which a financial institution allocates risk capital across its business activities to satisfy a firm-wide capital requirement, we show that the optimal capital allocation is a linear function of the division's risk-taking, measured by the variance of cash flow from that division, and that the allocation depends on correlations in cash flows across all divisions. Furthermore, it can be shown that capital allocation influences the risk aversion of division managers and traders. This key result relates risk management by the bank to the behaviour of its market-makers in asset markets. The risk-bearing capacity of a dealership market depends on the number of market-makers present, as well as on the risk aversion of each market-maker. Since market liquidity in dealership markets is determined by the inherent riskiness of the market and the risk-bearing capacity of the market, capital allocation affects market liquidity by influencing the risk aversion of market-makers.

Market liquidity is influenced by the way the market is structured. For example, most foreign exchange and government bond markets are characterized by price competition (quote-driven) among multiple dealers and interdealer trading rather than by Cournot competition (order-driven), and the actions of the dealers in the public and interdealer markets provide much of market liquidity. Such markets are referred to as dealership markets. This paper develops a dealership market model similar to the framework of Vogler (1997). However, we allow for heterogeneity among dealers with respect to their risk-bearing capacity. In general, market liquidity, measured by the bid-ask spread, depends on the risk aversion of all dealers in the market. The dealer with the lowest risk aversion (or the largest capacity for bearing risk) is able to offer the best price and receives public orders. This is the price at which customer orders are transacted and this price is decreasing in the risk aversion of the least risk-averse dealer, all other things being equal.

We apply this framework to examine the effects of financial consolidation on market liquidity. We assume that when two banks merge, the end result is a bank with a larger set of business lines or divisions. Clearly, the merger will have an impact on the level of risk capital allocated to market-making. We find that consolidation has an ambiguous effect on market liquidity. In particular, market liquidity can increase upon consolidation. Whether this happens depends on the correlation among the cash flows from the merged bank's division. This is in contrast to other results in the literature, which argue that market liquidity will necessarily deteriorate with consolidation. These other studies consider only the effects of a reduction in market-makers on risk-sharing, while our paper shows that the effect on liquidity of a bank merger will also depend critically on the risk-bearing capacities of dealers belonging to the banks before and after a merger.

Figures 1 to 4 illustrate our point: that a merged bank is more likely to allocate more capital to market-making when there is a negative correlation between market-making and the new activities of the bank, resulting in a decrease in the risk aversion of the dealer owned by that bank. Market liquidity improves (bid-ask spreads fall) following a merger if this decrease in risk aversion is large enough and if the initial number of dealers is large. Thus, a negative correlation between market-making and the new activities of a merged firm suggests the possibility of increased market liquidity.

Figure 1
Risk-taking in market-making, ρ = 0.5

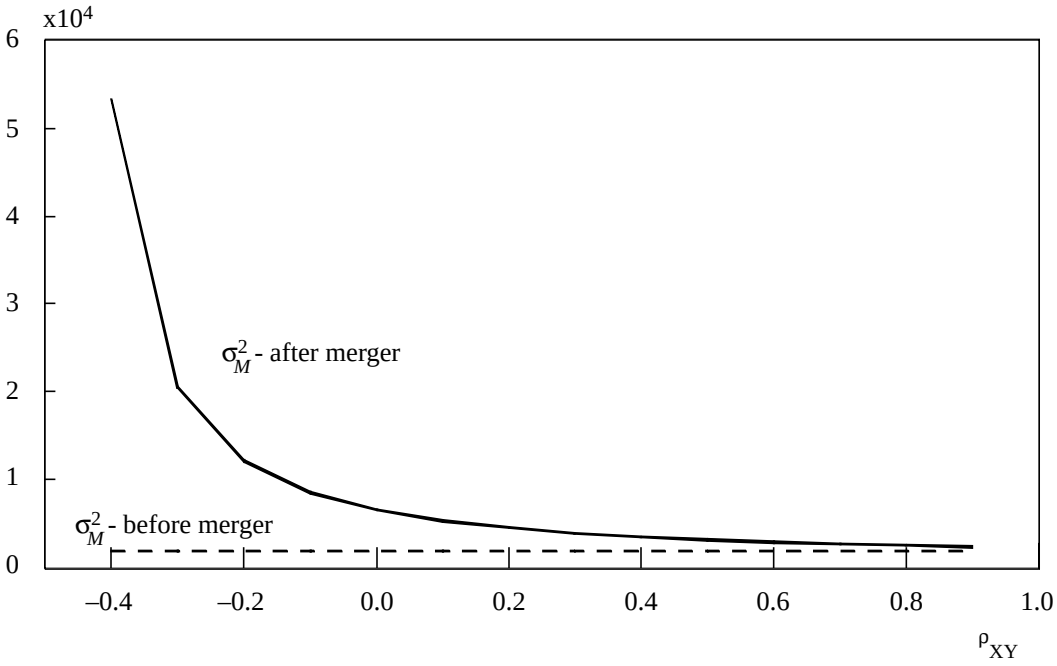


Figure 2
Risk-taking in market-making, ρ = 0

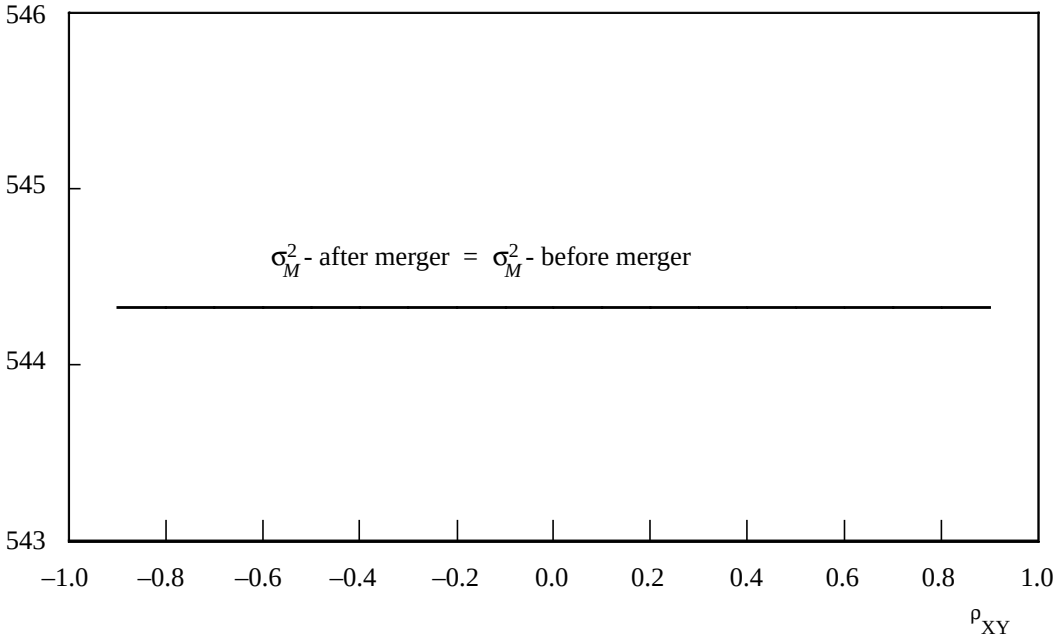


Figure 3
Risk-taking in market-making, ρ = 0.5

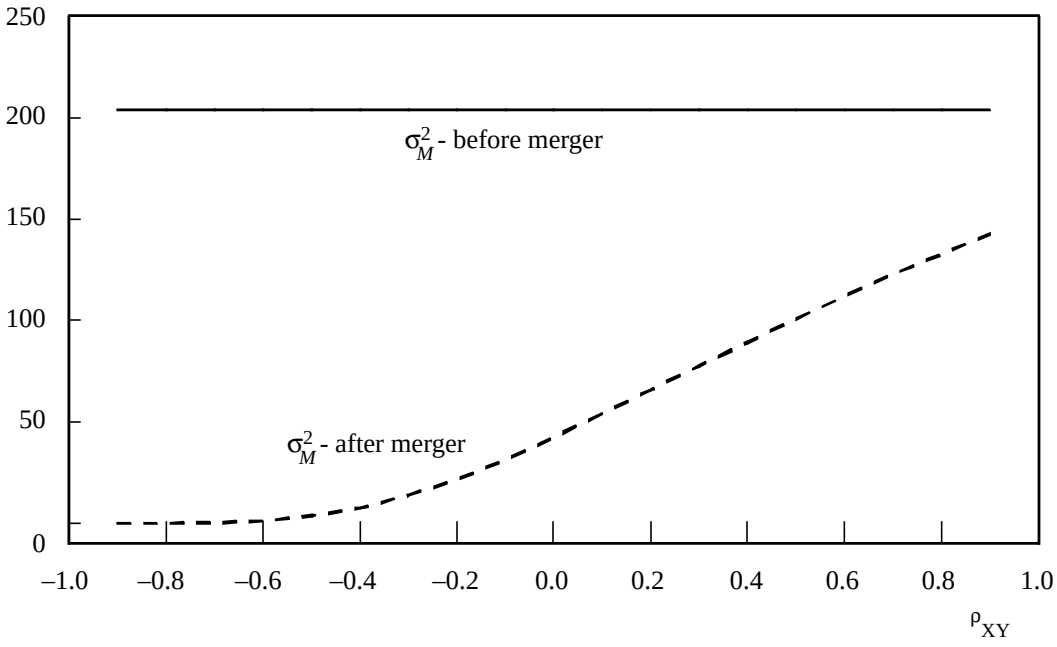
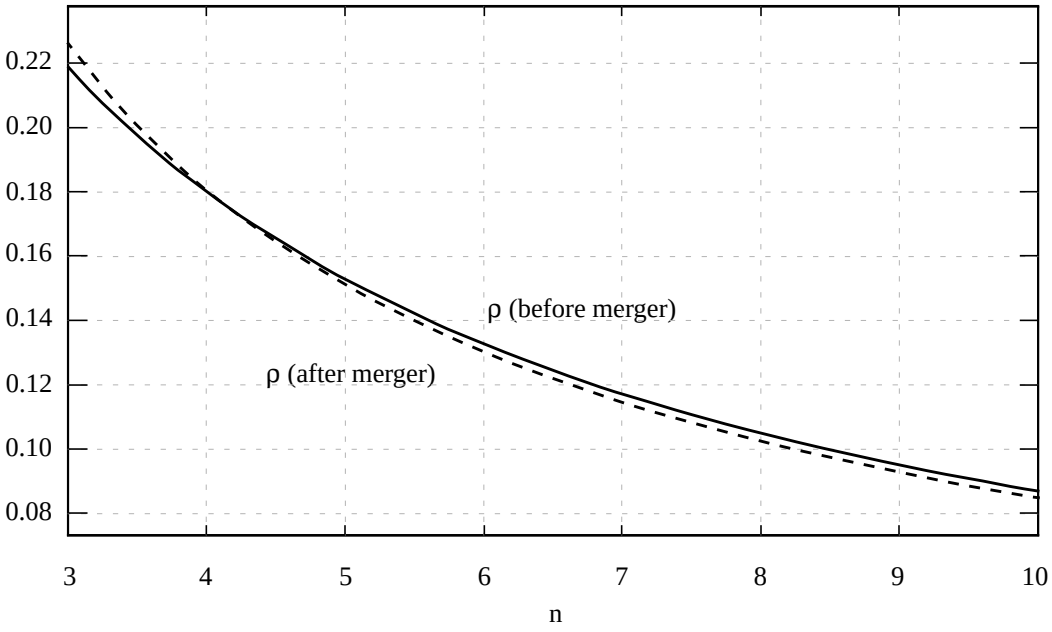


Figure 4
Equilibrium price (spread) in public market, δ = 0.4



A greater amount of risk-taking following a merger corresponds to a decline in the risk aversion of the dealer or an increase in capital allocated to market-making. Note that when the cash flow from market-making is negatively correlated to that from the rest of the bank, $\rho < 0$, risk-taking in market-making always increases after the merger; and when that correlation is positive, risk-taking in market-making declines. Risk-taking in market-making is unaffected by the merger only when market-making is uncorrelated to the rest of the bank.

Figure 4 shows that when the dealer belonging to the merged bank sees a decline in his risk aversion, the equilibrium market price (and spread) can be lower after the merger when the number of dealers to begin with, *n*, is large enough. In this case, market liquidity improves for $n > 4$.

In conclusion, a merger between two financial institutions can improve market liquidity in dealership markets, even in highly concentrated markets, if the merger results in a significant increase in the risk-bearing capacity of the market through an increase in capital allocation to market-making by the merged bank. Whether this occurs or not depends on the degree of economies of scope between market-making and the other activities of the bank. Our results suggest that policy-makers and regulators faced with a proposed merger between banks would want to examine the correlations among division cash flows.

Reference

Vogler, K.-H. 1997. "Risk Allocation and Inter-Dealer Trading." *European Economic Review* 41 (8): 1615–34.